

## **REMARKS**

Claims 84-95, 98-104, 108, 112-118, 120-125, 127, and 129 were previously presented. Claims 83 and 126 are amended. Claims 1-82, 96-97, 105-107, 109-111, 119, 128, and 130 are canceled. New claims 131-133 are added. In view of these changes, claims 83-95, 98-104, 108, 112-118, 120-127, and 129, and 131-133 remain pending in the application.

### **Claim 83**

#### **Claim 83 satisfies the Written Description Requirement**

Claim 83 is amended to include subject matter from claim 130. Claim 130 stands rejected for failing to meet the written description requirement. Accordingly, claim 83 is addressed below in the context of failing to satisfy the written description requirement.

As amended, Claim 83 contains three limitations that each appear to be a source of this rejection. The first limitation is that “the “self-assembly monolayer (is) positioned on the reference electrode.” The second limitation is that the “the self-assembly monolayer include(es) biotinylated thiol molecules.” The third limitation is that the biotinylated thiol molecules “include a sulfur that is bonded directly to the reference electrode.” The paragraphs below discuss the support for each of these limitations separately and then consider this support in combination.

As noted above, the first limitation at issue provides that that the “self-assembly monolayer (is) positioned on the reference electrode.” This limitation is supported by paragraph 64 which teaches modifying “the surface on **at least one of the electrodes** ... using a self-assembly monolayer (SAM)” (emphasis added). Since the specification teaches that the electrodes are a working electrode, a counter electrode, and a reference electrode (paragraph 59, 75, 84, 85, etc.), paragraph 64 teaches using a self-assembly monolayer (SAM) to modify the surface of at least one electrode selected from a group including the working electrode, counter electrode, and reference electrode. The above limitation is merely directed to the case where the

reference electrode is the selected electrode. As a result, the specification supports the limitation that “self-assembly monolayer ... positioned on the reference electrode” as is claimed.

The second limitation provides that “the self-assembly monolayer include(es) biotinylated thiol molecules.” The specification teaches that the self-assembly monolayer can include biotinylated thiol molecules in a number of locations including paragraphs 166, 173, 173, 184. As a particular example, paragraph 166 describes “a SAM of a biotinylated thiol.” Accordingly, the specification supports the limitation that the “self-assembly monolayer include(es) biotinylated thiol molecules.”

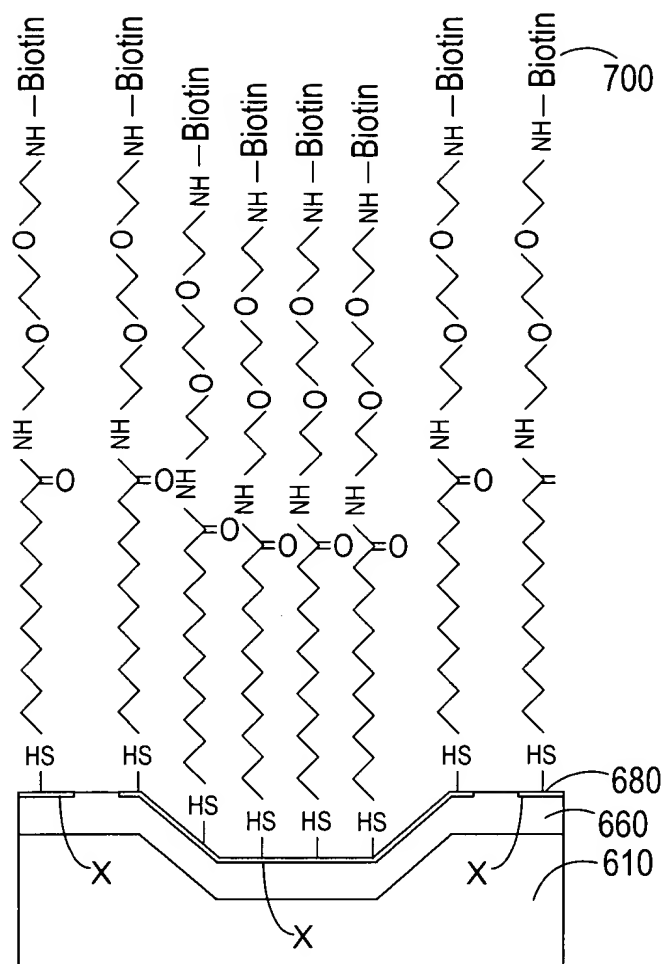
The third limitation provides that the biotinylated thiol molecules “include a sulfur that is bonded directly to the reference electrode.” Figure 20 illustrates self-assembly monolayer with biotinylated thiol molecules having a sulfur bonded directly to a patterned “gold surface” labeled 680. Paragraph 122 teaches that the “electrodes for biosensing are patterned” from “a layer of gold” 680. Since the gold 680 shown in Figure 20 is patterned, the gold 680 shown in Figure 20 serves as an electrode. Accordingly, the specification teaches that when a self-assembly monolayer with biotinylated thiol molecules is positioned on an electrode, a sulfur in the biotinylated thiol molecules can be bonded directly to the electrode.

Considering the above teachings together shows that the specification teaches a “self-assembly monolayer ... positioned on the reference electrode” and also that the self-assembly monolayer can include biotinylated thiol molecules. As a result, person of reasonable skill would understand that the Applicant was in possession of a self-assembly monolayer that includes biotinylated thiol molecules on a reference electrode. Additionally, the specification teaches that when a self-assembly monolayer with biotinylated thiol molecules is positioned on an electrode, a sulfur in the biotinylated thiol molecules can be bonded directly to the electrode. Since the reference electrodes is one of the electrodes, a person skilled in the art would understand that the Applicant as in possession of a self-assembly monolayer that includes biotinylated thiol molecules on a reference electrode where a sulfur in the biotinylated thiol molecules is bonded directly to the reference electrode. For these reasons alone, amended claim 83 satisfies the written description requirement.

The Specification Includes Additional Support for Claim 83 Satisfying the Written Description Requirement

Figure 20 alone also shows that claim 83 satisfies the written description requirement. Paragraph [0166] teaches biotin-DAD-C12-SH molecules included in a self-assembly monolayer (SAM) when it states “depositing a SAM of a biotinylated thiol, biotin-DAD-C12-SH.” Figure 20 shows the biotin-DAD-C12-SH positioned on the reference electrode, the working electrode and the counter electrode. Accordingly, Figure 20 shows a self-assembly monolayer that includes biotinylated thiol molecules positioned on the reference electrode. Additionally, Figure 20 shows that the biotinylated thiol molecules include a sulfur bonded directly to the reference electrode as is claimed.

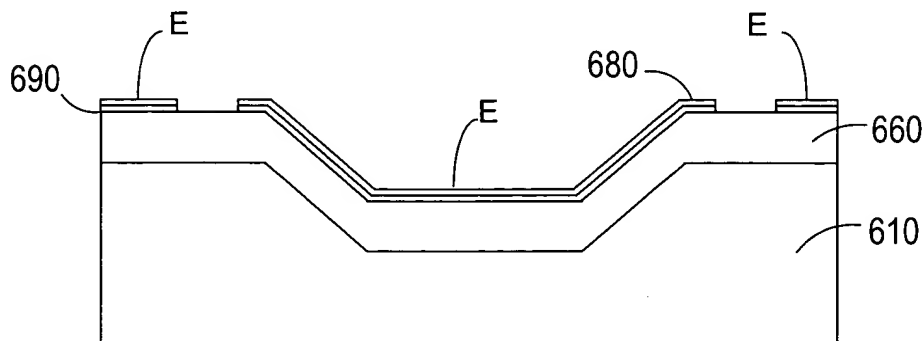
Despite teachings associated with Figure 20, the Office Action indicates that this rejection results from the failure of Figure 20 to specifically label each of the illustrated electrodes as a counter electrode, a reference electrode and a working electrode but only labels an electrode on the sensor with reference numeral 680 which the specification describes as “a gold layer.” Figure 20 actually shows three different electrodes. Figure 20 is shown below with each of the different electrodes labeled X.



**Figure 20**

Paragraphs 119-122 and the associated figures show that the regions marked X in Figure 20 are each a different electrode. This section of the specification teaches a method of forming the sensor. In particular, paragraph 122 teaches that the “electrodes for biosensing are patterned” from a “layer of gold” 680. This paragraph references figures 18 –19. Accordingly, the layer of gold shown across the entire sensor in Figure 18 and labeled 680 is patterned into electrodes shown in Figure 19. Figure 19 is shown below with each of the regions of patterned gold that serves as a different electrode labeled E. The specification teaches that the electrodes for the sensor are a working electrode, a counter electrode, and a reference electrode at paragraph 59,

75, 84, 85, etc. Accordingly, the different layers of gold that remain on the sensor of Figure 19 represent a counter electrode, a reference electrode, and a working electrode.



**Figure 19**

The cross-section of the sensor shown in Figure 20 corresponds to the cross-section of the sensor shown in Figure 19 without the optional adhesive 690. For instance, note that the reference numeral 680 used in Figures 19 and 20 each denote patterned gold which serves as an electrode. Accordingly, Figure 20 also shows the counter electrode, working electrode, and reference electrode that are shown in Figure 19.

Additionally, Figure 20 is a cross-section of the sensor. For instance, a cross-section of the sensor illustrated in Figure 5 taken vertically would yield the cross-section shown in Figure 20. Accordingly, the working electrode 420, reference electrode 430, and counter electrode 440 shown in Figure 5 would translate to each of the electrodes shown in Figure 20.

Since one of the electrodes shown in Figure 20 serves as a reference electrode and the self-assembly monolayer is shown positioned on each of the electrodes, Figure 20 shows the self-assembly monolayer being positioned on the reference electrode. Additionally, the illustrated self-assembly monolayer includes biotinylated thiol molecules that include a sulfur that is bonded directly to the reference electrode as is claimed. As a result, a person of ordinary skill in the art would recognize that the Applicant was in possession of amended claim 83 at the time the Application was filed.

### **Claim 126**

Claim 126 stands rejected for failing to satisfy the written description requirement.

Claim 126 depends from claim 83. Claim 83 specifies “a self-assembly monolayer being positioned on the reference electrode, the self-assembly monolayer including biotinylated thiol molecules that include a sulfur that is bonded directly to the reference electrode. Claim 126 specifies that “the self-assembly monolayer is positioned on the working electrode, and the counter electrode, the self-assembly monolayer including biotinylated thiol molecules bonded to the counter electrode and the working electrode.” Accordingly, claim 126 requires that the self-assembly monolayer is positioned on the working electrode, the counter electrode, and the reference electrode.

As noted above, the sensor in figure 20 illustrates a working electrode, a counter electrode, and a reference electrode. Since Figure 20 illustrates a self-assembly monolayer positioned on each of the electrodes, Figure 20 shows the self-assembly monolayer positioned on on a reference electrode, a working electrode, and a counter electrode as is specified in Claim 126. Additionally, Figure 20 illustrates that the self-assembly monolayer includes biotinylated thiol molecules that include a sulfur that is bonded directly to the reference electrode and also includes biotinylated thiol molecules bonded to the counter electrode and the working electrode as is claimed. As a result, a person skilled in the art would recognize that the specification teaches every element of the claimed invention, a person skilled in the art would recognize that the Applicant was in possession of claim 126 at the time the Application was filed.

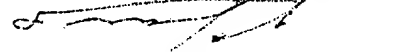
Finally, paragraphs 176-180 also supports claim 126. These paragraphs describe experiments performed using “Au for all three electrodes, i.e. working, auxiliary, and reference electrodes” as described in paragraph 176. Paragraph 179 then provides that “Streptavidin was immobilized on the Au.” Since each of the electrodes is Au and the Streptavidin was immobilized on the Au, the Streptavidin was immobilized on each of the electrodes. Further review of paragraph 179 shows that biotinylated thiol was used to immobilize the Streptavidin to the Au (“streptavidin immobilized via the biotinylated thiol to Au”). Since the biotinylated thiol was used to immobilize the Streptavidin and the Streptavidin was immobilized on each of the electrodes, the biotinylated thiol was used on each of the electrodes. Accordingly, paragraph 176-180 teaches a “self-assembly monolayer positioned on the working electrode, the counter

electrode, and the reference electrode where the self-assembly monolayer includes biotinylated thiol molecules.

## CONCLUSION

The Examiner is encouraged to telephone the undersigned with any questions.

Respectfully submitted:



TRAVIS DODD  
Reg. No. 42,491

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Gavrilovich, Dodd & Lindsey, LLP  
2490 Heyneman Hollow  
Fallbrook, CA 92028  
Telephone: (760) 415-2352  
Telephone: (760) 731-3091  
Fax: (760) 728-1541  
E-mail: [LISDodd@aol.com](mailto:LISDodd@aol.com)